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10/749,472	12/31/2003	Osvaldo Colavin	03-LJ-038	3927

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EXAMINER	
GEIB, BENJAMIN P	

ART UNIT	PAPER NUMBER
2181	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/749,472	COLAVIN ET AL.	
	Examiner	Art Unit	
	BENJAMIN P. GEIB	2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 and 7-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Guttag et al., U.S. Patent No. 5,590,350 (hereinafter Guttag).

3. Referring to claim 1, Guttag has taught a method for supporting software pipelining, comprising:

receiving a shift mask signal having information on a shifting region of a register file *[A shift mask signal would be part of an instruction that is passed through the circuitry. The functional signal generator 245 receives a decoded instruction from the instruction decode logic 250. For example, the A+(B&C) function, found in column 6 (5th function in the table has a C shift mask); see Fig. 5; table 23 in columns 61 and 62]*;

receiving a shift signal to trigger a shift *[executing the shift instruction requires a shift signal; see Fig. 5; table 23 in columns 61 and 62]*;

identifying a shifting register queue based on the shift mask signal, wherein the shifting register queue comprises a plurality of queue registers *[32 shifting registers are shown in Fig. 8 attached in a queue-like fashion. Guttag has taught similar functionality regarding the barrel rotator and that "a controllable shifter is an alternate to the barrel rotator" (see abstract)]*; and

shifting the contents of the queue registers based on the shift signal *[the system will perform the instruction as decoded, which will result in the shifting of the contents of the queue register based on the shift signal in the case of a shift instruction; see Fig. 5; table 23 in columns 61 and 62].*

4. Referring to claim 2, Guttag has taught the method of Claim 1, wherein the shift mask signal is received from a shift mask register associated with the shifting register queue *[Guttag teaches that a rotation register feeds the ALU with instructions indicating a rotation is necessary and, therefore, if a*

rotator was replaced with a shifter, one having ordinary skill in the art would recognize that the same functionality would also be used with a shifter; see Fig. 5; column 24, lines 33-38].

5. Referring to claims 3 and 20, taking claim 3 as exemplary, Guttag has taught the method of Claim 1, wherein the shift signal is received from an external component *[A shift instruction is introduced from an external source; Figs. 1 & 5].*

6. Referring to claims 4 and 16, taking claim 4 as exemplary, Guttag has taught the method of Claim 1, wherein the register file comprises the plurality of queue registers and a plurality of non-queue registers *[see Figs. 5 & 8; the queue registers are only a part of the register]*, and wherein the shift mask signal comprises a plurality of bits *[see table 23 in columns 61 and 62; column 60, line 62 - column 61, line 7; abstract]*, each bit associated with a corresponding register in the register file *[column 5, lines 46-67].*

7. Referring to claim 5, Guttag has taught the method of Claim 4, wherein the bits in the shift mask signal that comprise 1s correspond to the queue registers, and wherein the bits in the shift mask signal that comprise 0s correspond to the non-queue registers *[Guttag teaches similar functionality regarding the rotator and, therefore, if a rotator was replaced with a shifter, one having ordinary skill in the art would recognize that the same functionality would also be used with a shifter; see Fig. 8; column 5, lines 46-67].*

8. Referring to clam 7, Guttag has taught a system for supporting software pipelining comprising:

a register file *[see Figs. 5 & 8]* comprising:

a plurality of queue registers forming a shifting register queue based on a shift mask signal having information on a shifting region of the register file *[Guttag teaches similar functionality regarding the rotator and, therefore, if a rotator was replaced with a shifter (see abstract), one having ordinary skill in the art would recognize that the same functionality would also be used with a shifter; see Fig. 8]*; and

at least one non-queue register located between two queue registers *[not all the register are queue registers; see Figs. 5 & 8].*

9. Referring to claims 8 and 14, taking claim 8 as exemplary, Guttag has taught the system of claim 7, further comprising a shift mask register operable to identify the queue registers within the register file *[Guttag teaches similar functionality regarding the rotator and, therefore, if a rotator was replaced with a*

shifter, one having ordinary skill in the art would recognize that the same functionality would also be used with a shifter; see Fig. 8; column 5, lines 46-67].

10. Referring to claims 9 and 15, taking claim 9 as exemplary, Guttag has taught the system of claim 8, wherein the shift mask register is further operable to provide the shift mask signal to the register file to identify the queue registers for the register file *[Guttag teaches similar functionality regarding the rotator and, therefore, if a rotator was replaced with a shifter, one having ordinary skill in the art would recognize that the same functionality would also be used with a shifter; see Fig. 8; column 5, lines 46-67].*

11. Referring to claims 10 and 17, taking claim 10 as exemplary, Guttag has taught the system of claim 7, wherein the register file further comprises: write decoding logic operable to generate control signals and write signals; and a plurality of multiplexers, wherein each multiplexer corresponds to a register within the register file and is operable to receive one of the control signals from the write decoding logic and is further operable to provide write data to the corresponding register based on the control signal *[Multiplexer and decoders are available to the register file; see Fig. 5].*

12. Referring to claims 11 and 18, taking claim 11 as exemplary, Guttag has taught the system of claim 10, wherein the registers within the register file comprise edge-triggered flip-flops, and are operable to receive the write data from the multiplexer and to receive one of the write signals from the write decoding logic *[one having ordinary skill in the art would recognize that an edge-triggered flip-flop can be used as a register].*

13. Referring to claims 12 and 19, taking claim 12 as exemplary, Guttag has taught the system of claim 11, wherein for each register other than a first register, the write data provided by each multiplexer to the corresponding register based on the control signal comprises data from a previous register in the register file *[Guttag has taught rotation of data; see Fig. 8].*

14. Referring to claim 13, Guttag has taught a system for supporting software pipelining comprising: a register file operable to receive a shift mask signal and a shift signal, to identify a shifting register queue having a plurality of queue registers within the register file based on the shift mask signal, and to shift the contents of the queue registers based on the shift signal *[Guttag teaches similar functionality regarding*

the rotator and, therefore, if a rotator was replaced with a shifter (see abstract), one having ordinary skill in the art would recognize that the same functionality would also be used with a shifter; see Figs. 5 & 8].

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guttag.

17. Referring to claim 6, Guttag has taught the method of Claim 4. Guttag has not explicitly taught using 0s to identify bits. Guttag does teach using 1s to identify bits (see rejection of claim 5). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Guttag to include the bits in the shift mask signal corresponding to the queue registers comprising 9s, and the bits in the shift mask signal corresponding to the non-queue registers comprising 1s (see column 5, lines 46-67; 1s are used to identify in the rotation mask register; but one having ordinary skill in the art could implement a mask where 0s are used to identify, which could also be done in a shift mask register).

Response to Arguments

18. Applicant's arguments filed 04/14/2008 have been fully considered but they are not persuasive.

19. Regarding the applicant's argument that "Guttag, however, fails to teach or disclose, for example, a shift mask signal having information on a shifting region of a register file," the examiner notes that Guttag has taught executing shift instructions wherein the shift instruction includes a shift mask. See table 23, columns 61 and 62. Because the instruction specifies a shift mask, the decoded instruction will contain a shift mask signal that contains information on how to shift a particular register. Therefore, Guttag has taught "a shift mask signal having information on a shifting region of a register file" as recited in the claim. It appears to the examiner that the applicant is reading this limitation to indicate that the shift

mask signal specifies information in the particular way described in applicant's specification and on the particular register specified in applicant's specification. However, while the claim limitations must be read in light of the specification, limitations from the specification are not read into the claims. If the applicant intends for the shift mask signal to specify how to shift in a particular way on a particular register, such limitations should be added to the claim.

20. Regarding the applicant's argument that "Guttag fails to teach or disclose, for example, identifying a shifting register queue based on the shift mask signal, wherein the shifting register queue comprises a plurality of queue registers," the examiner notes that Guttag has taught a plurality of queue registers forming a shifting register queue. See Fig. 8. The shift mask signal identifies how the registers in the shift register queue are to be shifted. See Fig. 5. Therefore, Guttag has taught "identifying a shifting register queue based on the shift mask signal, wherein the shifting register queue comprises a plurality of queue registers" as recited in the claim.

21. Regarding the applicant's argument that "Guttag fails to teach or disclose, for example, a shifting register queue based on a shift mask signal having information on a shifting region of the register file," the examiner notes that Guttag has taught these limitation for reasons similar to those given above in paragraphs 19 and 20.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

23. Rau et al., "Register Allocation for Software Pipelined Loops," has taught a rotating register file used to rename registers for each instance of a loop variable.

24. Smelyanskiy et al, "Register Queues: A New Hardware/Software Approach to Efficient Software Pipelining," has taught using register queues to reduce pressure on registers due to software pipelining.

25. Tsushima et al., U.S. Patent No. 5,872,989, has taught a register file used to support software pipelining.

26. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BENJAMIN P. GEIB whose telephone number is (571)272-8628. The examiner can normally be reached on Mon-Fri 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alford Kindred can be reached on (571) 272-4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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